

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 -14. (Cancelled).

15. (Previously Presented) A purification device for an exhaust gas of a diesel engine, the diesel engine comprising a catalyst which traps nitrogen oxides in the exhaust gas but decreases a nitrogen oxides trapping performance when poisoned by sulfur oxides in the exhaust gas, and a filter which traps particulate matter in the exhaust gas, the device comprising:

a programmable controller programmed to:

determine if an elimination of the sulfur oxides poisoning the catalyst is required;

perform a process of eliminating the sulfur oxides poisoning the catalyst, when elimination of the sulfur oxides poisoning the catalyst has been determined to be required;

determine if a regeneration of the filter is required while performing the process of eliminating the sulfur oxides;

perform the regeneration of the filter while interrupting the process of eliminating the sulfur oxides, when the regeneration of the filter has been determined to be required;

determine during the regeneration of the filter if a residual particulate matter in the filter has decreased to a level which does not damage the filter when the residual particulate matter in the filter burns; and

stop the regeneration of the filter and resume the process of eliminating the sulfur oxides poisoning the catalyst, when the residual particulate matter in the filter has decreased to a level which does not damage the filter when the residual particulate matter in the filter burns.

16. (Previously Presented) The purification device as defined in Claim 15, wherein the process of eliminating the sulfur oxides poisoning the catalyst is performed by causing the catalyst to contact with an exhaust gas corresponding to a rich air-fuel ratio, and the regeneration of the filter is performed by burning a trapped particulate matter by causing the filter to contact with an exhaust gas corresponding to a lean air-fuel ratio.

17. (Previously Presented) The purification device as defined in Claim 16, further comprising a sensor which detects a differential pressure between an inlet and an outlet of the filter, and the controller is further programmed to determine if the regeneration of the filter is required based on the differential pressure.

18. (Previously Presented) The purification device as defined in Claim 16, wherein the exhaust gas corresponding to the rich air-fuel ratio corresponds to an exhaust gas produced by combustion of an air-fuel mixture wherein an excess air factor is within the range 0.95 to 1.0.

19. (Previously Presented) The purification device as defined in Claim 16, wherein the exhaust gas corresponding to the lean air-fuel ratio, corresponds to an exhaust gas produced by combustion of an air-fuel mixture wherein an excess air factor is within the range 1.05 to 1.1.

20. (Previously Presented) The purification device as defined in Claim 16, further comprising an intake throttle which regulates an intake air amount of the engine, and the controller is further programmed to generate the exhaust gas corresponding to the rich air-fuel ratio and the exhaust gas corresponding to the lean air-fuel ratio through control of the intake throttle.

21. (Previously Presented) The purification device as defined in Claim 16, further comprising a fuel injector which injects fuel into the exhaust gas of the engine, and the controller is further programmed to generate the exhaust gas corresponding to the rich air-fuel ratio and the exhaust gas corresponding to the lean air-fuel ratio through control of a fuel injection amount of the fuel injector.

22. (Previously Presented) The purification device as defined in Claim 16, wherein the engine comprises an exhaust gas recirculation passage which recirculates part of the exhaust gas into an intake air according to an exhaust gas pressure of the engine, the purification device further comprises an exhaust throttle which regulates the exhaust gas pressure, and the controller is further programmed to generate the exhaust gas corresponding to the rich air-fuel ratio and the exhaust gas corresponding to the lean air-fuel ratio through control of the exhaust throttle.

23. (Previously Presented) The purification device as defined in Claim 16, further comprising a fuel injector which supplies fuel for combustion, and the controller is further programmed to generate the exhaust gas corresponding to the rich air-fuel ratio and the exhaust gas corresponding to the lean air-fuel ratio through control of a post-injection by the fuel injector after fuel is supplied for combustion.

24. (Previously Presented) The purification device as defined in Claim 16, wherein the controller is further programmed to determine that the residual particulate matter in the filter has decreased to a level which does not damage the filter, when the exhaust gas has been maintained in a state corresponding to the lean air-fuel ratio for a predetermined time.

25. (Previously Presented) The purification device as defined in Claim 16, wherein the controller is further programmed to determine that the regeneration of the filter is required when the particulate matter trap amount is saturated, and determine that residual particulate matter in the filter has decreased to the level which does not damage the filter when the particulate matter trap amount is zero.

26. (Previously Presented) The purification device as defined in Claim 17, wherein the controller is further programmed to determine that the residual particulate matter in the filter has decreased to a level which does not damage the filter, when the controller started to generate the exhaust gas corresponding to the rich air-fuel ratio for the first time.

27. (Previously Presented) A purification device for an exhaust gas of a diesel engine, the diesel engine comprising a catalyst which traps nitrogen oxides in the exhaust gas but decreases a nitrogen oxides trapping performance when poisoned by sulfur oxides in the exhaust gas, and a filter which traps particulate matter in the exhaust gas, the device comprising:

means for determining if an elimination of the sulfur oxides poisoning the catalyst is required;

means for performing a process of eliminating the sulfur oxides poisoning the catalyst, when the elimination of the sulfur oxides poisoning the catalyst has been determined to be required;

means for determining if a regeneration of the filter is required while performing the process of eliminating the sulfur oxides;

means for performing the regeneration of the filter while interrupting the process of eliminating the sulfur oxides, when the regeneration of the filter has been determined to be required;

means for determining during the regeneration of the filter if a residual particulate matter in the filter has decreased to a level which does not damage the filter when the residual particulate matter in the filter burns; and

means for stopping the regeneration of the filter and resuming the process of eliminating the sulfur oxides poisoning the catalyst, when the residual particulate matter in the filter has decreased to a level which does not damage the filter when the residual particulate matter in the filter burns.

28. (Previously Presented) A purification method for an exhaust gas of a diesel engine, the diesel engine comprising a catalyst which traps nitrogen oxides in the exhaust gas but decreases a nitrogen oxides trapping performance when poisoned by sulfur oxides in the exhaust gas, and a filter which traps particulate matter in the exhaust gas, the method comprising:

determining if an elimination of the sulfur oxides poisoning the catalyst is required;

performing a process of eliminating the sulfur oxides poisoning the catalyst, when the elimination of the sulfur oxides poisoning the catalyst has been determined to be required;

determining if a regeneration of the filter is required while performing the process of eliminating of the sulfur oxides;

performing the regeneration of the filter while interrupting the process of eliminating the sulfur oxides, when the regeneration of the filter has been determined to be required;

determining during the regeneration of the filter if a residual particulate matter in the filter has decreased to a level which does not damage the filter when the residual particulate matter in the filter burns; and

stopping the regeneration of the filter and resuming the process of eliminating the sulfur oxides poisoning the catalyst, when the residual particulate matter in the filter has decreased to a level which does not damage the filter when the residual particulate matter in the filter burns.

29. (Previously Presented) The purification device as defined in Claim 15, wherein the diesel engine is used for driving a vehicle, and the controller is further programmed to determine that the elimination of the sulfur oxides poisoning the catalyst is required on the basis of at least one of a travel distance of the vehicle, a fuel consumption amount of the diesel engine, and a travel time of the vehicle, after the latest elimination of sulfur oxides poisoning.